

# Prevalence of Scapular Dyskinesia in Young Adults with Trapeztitis - A Cross-Sectional Study

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## ABSTRACT

**Background:** An abnormal movement of the scapula during shoulder movement is termed as scapular dyskinesia and is an often-forgotten cause of pain and dysfunction. The scapula is a key part of the upper limb kinematic chain and is a vital component of the glenohumeral rhythm. Trapeztitis is an inflammatory pain resulting from trapezius muscle. Trapezius is a stabilizer in Scapular dynamics contributing to scapulohumeral rhythm. Weakness or improper activation of Scapular stabilizers can alter Scapular positioning and mechanics. Aim of this study is to find prevalence of Scapular Dyskinesia in young adults with Trapeztitis.

**Methodology:** One hundred eighteen young adults of age 18-25 years with Trapeztitis selected by convenience sampling participated in this cross sectional study. Participants were allotted to three groups (mild, moderate, severe) according to severity of Trapeztitis on the basis of their VAS score. Dynamic scapular Dyskinesia test was used to assess Scapular Dyskinesia. Statistical analysis was done using Microsoft excel version 2010.

**Results:** 118 participants had participated in the study. Out of which 32% participants had mild trapeztitis, 37% had moderate trapeztitis and 31% had severe trapeztitis. In subjects with mild trapeztitis 37% of their population had scapular dyskinesia whereas in subjects with moderate trapeztitis 57% had scapular dyskinesia and in participants with severe trapeztitis, scapular dyskinesia was witnessed in 72% of their population.

**Conclusion:** Present study evidences high prevalence of Scapular Dyskinesia in young adults with Trapeztitis.

**Key Words:** Scapular Dyskinesia, Trapeztitis, Young adults

## INTRODUCTION

The scapula plays a crucial role in coordinating and maintaining complex shoulder kinematics<sup>[1]</sup>. Scapular Dyskinesia is an alteration in the normal position or motion of scapula during coupled scapulohumeral movements. "Dys" alluded to 'alteration of' while "kinesis" alludes to 'movement' that demonstrates the loss of ordinary control of Scapular movement<sup>[3]</sup>. Inflexibility and contractures of muscles and ligaments around shoulder can affect the position and movement of scapula<sup>[6]</sup>

The scapula is anatomically and biomechanically intimately involved in shoulder function<sup>[6]</sup>. Scapula provides synchronous scapular rotation during humeral motion and function as a link in kinetic chain<sup>[7]</sup>. If Scapular position is impaired the forces generated from lower extremity and trunk will not be effectively transmitted to upper extremity. This loss of link function results in altered scapular biomechanics<sup>[6]</sup>. Serial muscular activation patterns stabilizes scapula and increases the control of its motion and position as the arm is moved<sup>[6]</sup>. Scapular stabilization requires

coupling of upper and lower trapezius, serratus anterior and rhomboids muscles [6]. Inhibition or disorganization of activation patterns in Scapular stabilizing muscles can alter the scapular position thus causing scapular Dyskinesia [6]. Altered Scapular orientation is proven a risk factor for many shoulder and neck pathologies such as Impingement and neck pain [2].

Trapezius is an extensive muscle subdivided into upper middle and lower parts [4]. It extends longitudinally from occipital bone to lower thoracic vertebra and laterally to spine of scapula [5]. This muscle is a dominant stabilizer of scapula normally operating synergistically with other scapular muscles, mostly serratus anterior [4]. It also contributes to scapulohumeral rhythm through attachment on clavicle and scapula [5]. Trapezius and serratus anterior acts synergistically to produce many actions of scapula or clavicle typically associated with flexion or abduction of scapula [4].

The upper trapezius muscle is designated as postural muscle and it is highly susceptible to overuse [8]. Trapezitis defined as inflammation of trapezius muscle [8]. It is usually caused by placing too much stress or strain over trapezius muscle [9]. Trapezitis is most common musculoskeletal disorder [9]. It is common in age group of 18-30 years. Altered activation, poor control or reduced strength of different parts of trapezius muscle has been linked with abnormal Scapular movements, often associated with pain [4]. Abnormal posture makes the area vulnerable to a range of musculoskeletal Conditions by imparting large stresses to the neck and shoulders, as well as weakening the soft tissues by decreasing the biomechanical functions of the area, and inducing muscle stiffness and hypokinetics [10]

Previous studies have supported the stabilizing role of trapezius muscle on scapular motion and also its contribution to scapulohumeral rhythm. However, the direct association of trapezitis with scapular dyskinesia has not yet been established. Therefore, as study on prevalence of

Scapular Dyskinesia has not been conducted and explored much,. The main aim of this study is to know the prevalence of Scapular Dyskinesia in young adults with Trapezitis.

## **METHOD**

An observational study was conducted from February 2021 to June 2021. One hundred eighteen healthy young adults were selected by convenience sampling. Data for the study conducted was collected from various colleges and community areas of Ahmedabad and Himmatnagar. The subjects were allotted to three groups namely, mild moderate and severe according to severity of trapezitis based on their score on VAS scale. Scapular Dyskinesia was assessed using Dynamic Scapular Dyskinesia test.

**Inclusion Criteria** Willingness of subject to participate, both male and female, Age (18-25years), Subjects with unilateral trapezitis.

**Exclusion Criteria** Cervical spine disorders, Any Upper limb or vertebral fracture; Any head injury; Neurological disorder

## **OUTCOME MEASURES**

### **Dynamic Scapular Dyskinesia Test**

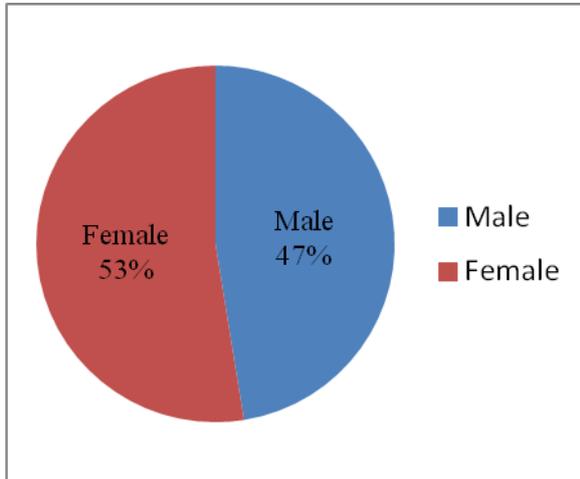
This consists of weighted shoulder flexion and abduction movement while the scapular motion is closely observed. The patient holds a 2-pound (1 kg) weight in each hand and first forward flexes and then abducts both arms. The clinician observes whether there is any winging, or prominence of the medial or inferior scapular borders, or any lack of coordinated movements (such as early scapular elevation or shrugging, when lifting the arm, or fast downward rotation when lowering the arm). Any deviation from the norm is noted as a 'yes' (dyskinesia is present) or 'no'.

### **Visual Analogue Scale**

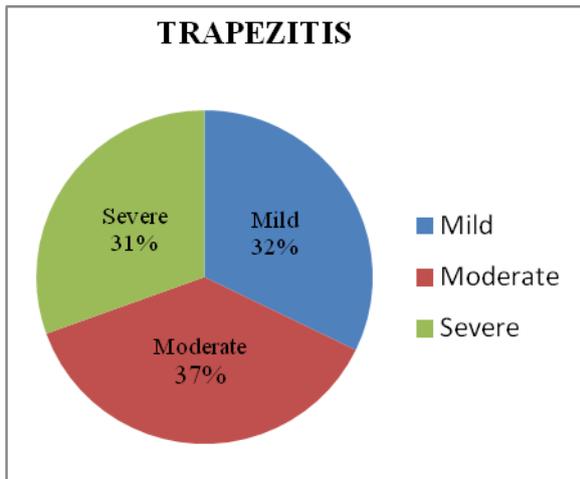
VAS was used to evaluate and quantify the pain experienced by the subjects. Origin of the scale is indicated as "NO PAIN" and the terminal end as

“MOST SEVERE PAIN”. The patient was instructed to move the indicator to represent his/her pain perceived. At the back of the scale 0 to 10 numerical with a distance of 1cm between them were marked.

**RESULTS**



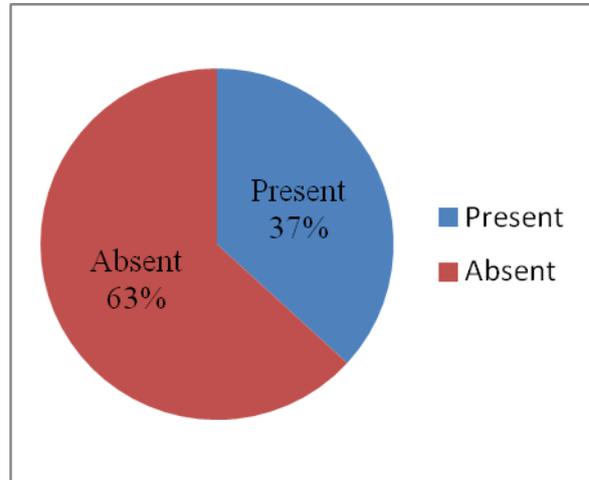
Graph 1: Percentage of female and male participants in the study



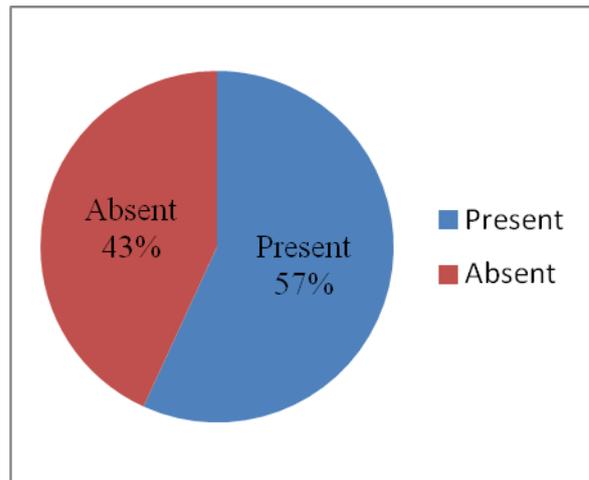
Graph 2 : Percentage of participants according to the severity of trapezitis

Statistical analysis was done using Microsoft Excel 2010. One hundred eighteen subjects participated in the study. Out of 118 participants, 56 were boys and 62 were girls which constituted 47% and 53% respectively. Mean age of the subjects was 22.5 years. Graph 1 illustrates the percentage of male and female participants prevailing in this study. Graph 2 demonstrates the population which falls into three categories namely mild moderate and severe on the basis of visual analogue score

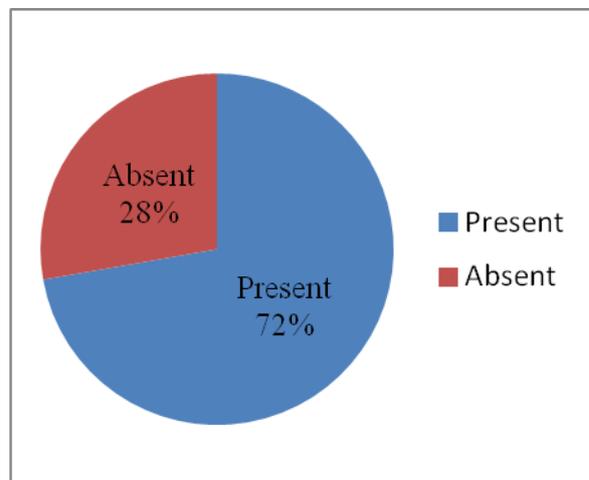
of trapezitis. Graph 3,4 and 5 evidences the percentage of participants having scapular dyskinesia on the basis of severity of trapezitis.



Graph 3 : Prevalence of scapular dyskinesia in subjects with mild trapezitis



Graph 4 : Prevalence of scapular dyskinesia in subjects with moderate trapezitis



Graph 5 : Prevalence of scapular dyskinesia in subjects with severe trapezitis

Result suggests 32% participants were having mild trapezitis out of which scapular dyskinesia was present in 37% of them. Also, 37% subjects were having moderate trapezitis. Among them 57% had scapular dyskinesia. High prevalence of scapular dyskinesia was seen 72% of population who were having severe trapezitis. (31%)

## DISCUSSION

Present study was conducted on 118 subjects with Trapezitis to find out the prevalence of Scapular Dyskinesia in them. Result of the present study shows significantly high prevalence of Scapular Dyskinesia in young adults with Trapezitis

Result shows that, in subjects with mild trapezitis 37% of their population had scapular dyskinesia whereas in subjects with moderate trapezitis 57% had scapular dyskinesia and in participants with severe trapezitis, scapular dyskinesia was witnessed in 72% of their population. This variation in the prevalence of dyskinesia among individuals with trapezitis suggests that severity of trapezitis creates an impact on scapular dynamics and thus can variably alter its position. This might be due to difference in rate of upper trapezius activation in trapezitis. Upper trapezius could be more hyperactive and increased its pull in severe trapezitis compared to mild and moderate trapezitis and thereby alternating scapular mechanics in scapulohumeral rhythm.

Impaired scapular kinematics and associated muscle activation are thought to result in shoulder disorders such as pain, restricted range of motion, and functional disability. Based on these assumptions, researchers have identified insufficient posterior tipping, external rotation, and upward rotation; decreased serratus anterior and lower trapezius activity; and increased upper trapezius muscle activity in patients with shoulder impingement<sup>[2]</sup>

Research has highlighted that the upper and lower trapezius along with serratus anterior are the muscles that mostly

affect scapular movement and cause dyskinesia. When the scapula biomechanics are considered in relation to the anatomy, it becomes evident that the combination of movements, planes and muscles involved there is a vast array of combinations that could lead to abnormal movement function<sup>[11]</sup>.

Studies suggest that trapezius and the serratus anterior muscles have been linked to the development of dyskinesia in both shoulder impingement and shoulder instability. In impingement, the upper and lower trapezius along with the serratus anterior has altered their activation pattern, with the trapezius showing a greater strength of activation compared to the serratus anterior<sup>[12]</sup>.

Studies have identified that individuals with shoulder pain that individuals with shoulder pain during elevation of the arm often present with abnormal or labored scapula movements in conjunction with (1) excessive activation of the upper trapezius and (2) decreased and/or delayed activation of the lower and middle trapezius and the serratus anterior. Specifically, excessive activation of the upper trapezius is likely associated with increased elevation of the clavicle coupled with undesired anterior tilt of the scapula.<sup>[4]</sup>

Peat and Grahame investigated trapezius, serratus anterior and deltoid EMG in people with and without shoulder pathology. They found that in those with shoulder pathology, UT showed increased activity during arm elevation and lowering (between 40 to 100 degrees of arm elevation). Also, serratus anterior showed decreased activity at some humeral elevation angles (between 70 to 100 degrees) compared to healthy controls. This increase in UT activity has been found in numerous other studies on UT activation and shoulder pathology<sup>[13]</sup>.

Moreover imbalances in force production of the serratus anterior and UT can result in a scapular elevation motion (or early shoulder shrugging). This may cause excess superior translation of the scapula,

with less efficient upward rotation and reduced posterior tilting<sup>[13]</sup>.

One of the unneglectable limitations of this study is that specific occupation has not been included. In future it is recommended to carry out study on various populations such as computer workers, Teachers, Medical staff and those who are more prone to these outcomes. Also, Postural and other Physiological factors which could alter Scapular dynamics should be taken into consideration in future.

## CONCLUSION

The current study evidences that trapezitis plays significant role in causing Scapular Dyskinesia. Moreover present study suggests high prevalence of Scapular Dyskinesia in young adults with Trapezitis.

## ACKNOWLEDGMENTS

I am very grateful to my guide and my parents who supported me constantly throughout the study. I am also thankful to all the subjects who participated in this study to make it worth.

**Conflict of Interest:** None

**Source of Funding:** None

**Ethical Approval:** Approved

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How to cite this article: Patel JP, Purohit A. Prevalence of scapular dyskinesia in young adults with trapezitis - a cross-sectional study. *Int J Health Sci Res.* 2021; 11(7):63-68. DOI: <https://doi.org/10.52403/ijhsr.20210710>

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